

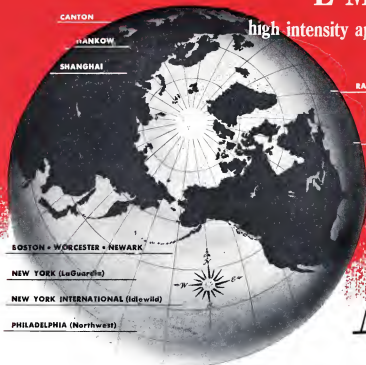
AVIATION WEEK

OCT. 25, 1948

A MCGRAW HILL PUBLICATION

L-M-Bartow

high intensity approach and runway lights



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General Electric nowballasts, GEA 4866, lists various standard aircraft ballasts and also other G-E aircraft transformers. You should have this catalog in your files. For a copy, and for assistance with any aircraft transformer problem, get in touch with your G-E sales office or write *Appendix Dept., General Electric Company, Schenectady 5, N. Y.*

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for
Aircraft*

Among General Electric aircraft transformers are the following:

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- special transformers for jet engines
- air conditioning transformers
- general purpose transformers
- special purpose transformers: altimeter, altimeter

All General Electric aircraft transformers are designed to:

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**AVIATION**
WEEK

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Journal of International Business Finance, Inc., and its Audit Bureau of Circulation



PRELUDE TO SURVIVAL

Forty-five years ago at Amesbury, Dr. David Wright married a girl he had
 mistaken a sister daughter of another classmate. He accomplished this, despite
 a complaint being that this scientific achievement provided a way of expanding
 friendship among the people of the world. — There has always been a reason behind
 the explosion can be a fabled instrument of aggression. **Q** Only three years before
 World War II — not just a year after the Air Force has commenced by the
 condensation of atomic mass energy — this is technology that makes use of
 a thousand American air power is a vital force in discouraging aggression
 nations. The public lives with the power in connection with atomic energy by the world.



Reynolds built the P-47 Thunderbolt, used as all fighters by the air forces of the Allied Nations in World War II. It is built today by our Air Force and our National Guard and we are now manufacturing full production on the 4000th P-47 Thunderbolt.

⁶ Several hundred of these are in daily service with UNAF groups throughout the country; meanwhile, development continues as faster, larger-scale efforts directed to provide new areas of performance. *Ranchito del Valle, Colombia*, 27 May.

"This is the quest of the Thunderbolt"

REPUBLIC AVIATION

Model of the Mighty Thunderbolt™ Thunderjet™ XR-10



CONTINENTAL AIRLINE inaugurates **CON-STARLINE SERVICE**. Five of these new 45-passenger Constellation Constellation 240's are scheduled to go into operation this fall. They offer economy per cubic foot of space which permits direct routing, higher speeds, and better engine service. Each engine's exhaust ducts are a constant, built up 130 lbs. of air thrust at 8,000 ft. Cabin air is supplied from Continental Airlines own Turbine Engine. Oil and other auxiliary lubricants are strictly... for those in the 10 percent.

ROBERT F. EDC, President, has headed Constellation Airlines since its inception. Continental Airlines has 27 cities in the Western states, 100 cities over 15,000 passengers a month, and has one of the most outstanding safety records.



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TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

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THE AVIATION WEEK

Propulsion Grab Bag

When Claude Ryan set down in 1936 to design an airplane capable of flying the Atlantic for youthful Charles Lindbergh, there was one problem he did not have to solve: power plant selection. His happy situation resulted because the 225-hp Wright J-5 Whirlwind was the only power plant in its class then available.

Yet this is a starting point, the remainder of the airplane fell almost automatically into place. Designers continued to produce aircraft based on such completed power plant selections until World War II—and their great Frank Whittle's superb jet turbine.

Today, the designer spends as much of his study time evaluating power plant/aircraft combinations as he used to spend in the preliminary design of the airplane itself. In addition to a diverse basic engine types, there are increasing engine variations and combinations of engines and components available to bedevil the airplane designer.

But as though that complex situation was not enough, propulsion research and development is continually changing the power plant spectrum through quick engine changes to meet today and moderately slow improvements in others. As a result, the range of available power plants has become a veritable "grab bag" into which the hopeful designer thrusts his hand with only a hazy idea of what it will bring forth.

Technical Battle

This complex situation is a tribulation to the engine industry. One of the great historic technical areas has been the narrow battle between turbine and engine manufacturers. Turbine has had early aircraft which were seriously underpowered. Then came World War I engine developments at McCook Field that produced engines far too powerful for existing aircraft with the exception of crowd-busting special utility types.

In the theater the battle swung the other way with such gains as the Boeing B-15 and Douglas B-19 demanding power far in excess of anything available. By World War II, it did the government, war, and the pendulum back with engines considerably more powerful than aircraft could accommodate.

To weave his way through this maze, the designer has balanced one major problem to achieve the desired advantage and balance of each power plant type: design engine speed of the airplane. Into the study must go considerations of altitude, range and useful load but the main avenue of approach is usually the question: "How fast?"

By evolving this fast under his calculations, all the runs come in efficiency, weight, useful load, etc. are immediately apparent. And on the other side of the reciprocating engine, significant of its more use transformations must eventually be verified.

Piston Engine Power

The compound engine, for all its admirable features, is a slow, heavy power plant. While its rate of fuel consumption per ton-mile is the lowest of any aircraft power plant, this rate increases rapidly in the speed of the airplane increases. If an airplane can be built at 160 mph., then the compound engine can produce a specific fuel consumption of only 0.14 lb. of fuel per hour per lb. of thrust.

But if that airplane is taken up to a cruising speed of 500 mph., this figure increases to that of the reciprocating engine alone. At 500 mph. this consumption is 0.65, which is already within sight of the turboprop engine. For absolute

weight the compound engine can't be beat but only if that weight is flown at less than 200 mph.

Turboprop Problems

The turboprop is in about the same boat as the reciprocating engine because it uses a propeller. It actually suffers in comparison to an absolute engine because you cannot "supercharge" a gas turbine engine; the turboprop will always have altitude characteristics markedly inferior to its sea level output. As the turboprop-powered aircraft either increases its speed or its altitude, the engine suffers. Although its relatively "reluctant" turboprop engines have been and will continue to be built, some engineers are convinced that this engine will die virtually at birth.

Its high power output (at 10,000 hp. and has already been developed) suffers the airplane designer because it means speed. But when the turboprop engine passes 400 mph., its performance goes lower and its fuel consumption sky rockets.

Its development problems have posed haunting. Cooling and control are problems of enormous difficulty. Propeller design for such a large engine is equally difficult since propellers have enough to absorb these great power actually reach its work at the engine shaft.

Under 100 mph., the turboprop can exhibit specific fuel consumption and specific weight lower than the reciprocating engine and provide more than twice as much power while doing so. But 500 mph., so many a useful cruising speed for either commercial or military future design.

Turbosjet Solution?

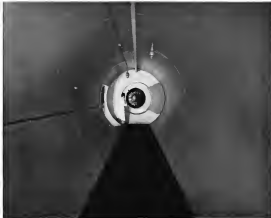
The turbosjet engine actually possesses all the virtues. It can provide maximum power at such as will ever be required for third propulsion. The power simply increases the faster the airplane flies, its fuel consumption improves, and the range of a turbosjet-powered aircraft can be tripled simply by flying above 40,000 ft. It is light, cheap to build, easy to maintain and virtually foolproof in operation. It is the ideal power plant for all high performance aircraft.

These facts are only one example out of the roster of positive virtues of the turbosjet engine. Behind the scenes, enormous progress has been made in the turbosjet engine, so much so in some of the conditions that Uncle Sam, in cooperation with his friends in England, has put his eggs in that one basket.

But right to the fuel consumption of the turbosjet engine already approaches that of the reciprocating engine under some comparable conditions and in its own sphere it is approaching it.

What has created this evolution that has realized commercial an engine long condemned to an excessive fuel use? The National Advisory Committee for Aeronautics, more than any other group, has brought the engine out of its various state of inefficiency and into a practical, down-to-earth economic power plant. This successful result is being brought about by turbine blade cooling.

If the aircraft designer, either commercial or military, can obtain a cruising speed of 550 mph., a cruising altitude above 40,000 ft. and a range of thousands of miles with satisfactory fuel economy, the turbosjet engine has the most economical, compounded, the turboprop in one shot power plant, then naturally he will turn to Claude Ryan the inventor of direct drive turbine that accommodates having only one liquid choice of power plant. That turbine will rest in the United States before 1950.



READY TO MEASURE AIR IN SLOW MOTION

► In about the time it takes you to read this advertisement, a size ten mass of high velocity air can come into this 20-inch "plenum" chamber and be suddenly slowed down to slow, painless motion so that engineers can measure it accurately.

► The chamber is one of the many devices used in the Wright Aeronautical research laboratories to study and evaluate the performance of compression for jet propulsion type engines.

► Because we're having a powerful compressor travel at very high velocities, it is difficult to determine the exact amount of pressure built up by it. By

the use of this huge plenum chamber the high velocity air dilutes to near-atmospheric pressure.

► The accuracy of the data obtained by making various compression designs in this unit is very important to Wright engineers—because a small increase in compressor efficiency results in a considerable increase in the overall efficiency and power output of new engines—and better efficiencies and higher powers are their constant goals.

► Another example of the painstaking research behind the development of Wright aircraft engines.



POWER FOR AIR PROGRESS

WRIGHT

Aeronautical Corporation • Wood-Ridge, New Jersey

AIRCRAFT
RESEARCH
LABORATORY

NEWS DIGEST

DOMESTIC

For the first time in the history of the Ford Aircraft Council an engine manufacturer was named to head the AIA's engineering advice C. J. Rocco, president of Continental Motors, Muskegon, Mich., was named chairman at a meeting in Detroit last week.

U. S. Air Force issued call for 10,000 former aviators to return to active duty for immediate assignment to units in England and Western Europe. Applications will be received at any U. S. Army recruiting station.

Edward F. Wilbur, Jr., design engineer of the radio division of Bendix Aviation Corp., has been appointed chairman of the Radio Technical Committee for Aeronautics special committee SC-44, which will investigate and make recommendations for standard airborne control panels.

Three flights of two Boeing B-47s will be sent to Alaska for maintenance training between Nov. 1 and May 15. They are part of the 14th Bomb Wing Strategic Air Command and will be based at Fairbanks.

Lockheed Aircraft Corp. is putting a Cessna 440B through CAA tests for a certified gross weight of 307,000 lb., a 3,000 lb. increase.

FINANCIAL

Douglas Aircraft Co. declared dividend of \$5 a share on 600,000 shares of outstanding common stock, payable Nov. 24 to holders as of Nov. 3.

Northrop Aircraft, Inc., paid dividend of 25 cents a share Oct. 13 to holders of record Oct. 6.

Mooney Manufacturing Co. has called shareholders meeting for Nov. 30 at company's offices at Burbank, Calif. Company recently reported profit of \$14,515 for fiscal year ended June 30 on sales of \$5,399,449.

FOREIGN

British Ministry of Supply has ordered 10 Airspeed Ambassador, two-engine, 40-passenger transports for British airways.

Royal Dutch-Shell (R.D.S.) has started a new service district from Moscow, Urengoy, to Geneva.

International Airline Traffic Association at the IATA dinner here in London reached a new high of \$12, 317,000 in August. January-August clearing house transactions totaled \$48 million, compared to \$25 million in the same 1947 period.

Russian planes serving Moscow have begun home delivery of tickets ordered by telephone.

INDUSTRY OBSERVER

► Northrop is negotiating with the Air Force for the conversion of the new 1935 reciprocating engine booster to the TB-67 type jet flying wing. The jet-wing version has exhibited performance far in excess of its original designers, and Northrop can no longer be completing the remaining flying wings in a configuration of linear performance.

► Continuing the therapeutic course of names for McDonnell aircraft, the McDonnell XH-61 has been named the Cobble and the XH-58 has been named the Voodoo.

► Northrop Turbohose is slated for type testing by the Air Force, and certain simple production contracts are expected. The turbohose engine has already delivered 10,000 hp. (shaft power now produced in a single aircraft engine of any type) to test version and some three different versions have been developed.

► Multi-engine certified for the Napier Niquid turbo-prop installation for the new Valiant Avianthus (Vanguard) Scout (insignia) will be the obsolescent Valiant Windsor Mark 1, a gas-turbine construction four motor booster. First prototype Vanguard has four Rolls-Royce Dart turboprops delivering a total of 4,000 hp. plus 1,000 lb. static thrust to sustain the Scout's greater power of 6,000 hp. plus 500 lb. S.T.

► Chase Aircraft Co. is completing its C-122 two-engine assault transport with a target flight date early in November. Meanwhile, the Air Force completed static tests on the CG-45, the C-122's glide counterpart, with all requirements exceeded, and three CG-180s have been delivered.

► Consolidated Vultee is still seeking funds to set up its airplane leasing corporation (Aviation Ware, Oct. 4), but eventual fate of the plan may depend more upon other manufacturers' reactions than upon ability to raise capital. Transport plane manufacturers in general apparently are cool to the idea. They fear the leasing corporation would become so large it could dictate plane types and designs. It is problematic whether Fred B. O'Hara, Carver chairman, will push the leasing plan for Carver planes alone unless he has some assurance that eventually the corporation could handle planes of other manufacturers as well.

► U. S. aviators returning from the various aviation conferences held recently in Europe feel that the Russian satellite nations are not about ready to close their borders to the control of western aviation. Opening part of the campaign over a Czechoslovakian case to stop British European Airways service in Prague.

► New jet fighter will be developed for the Royal Australian Air Force by the Commonwealth Aircraft Corp. CAC is now testing up to produce the Collins Rover New jet for evaluation in the de Havilland Vampire, but the RAAF has been so impressed with performance of the Canberra Panther, powered with the same turbojet, that it wants a similar model designed and built in Australia. Meanwhile, assembly of the obsolescent Mustang fighters is continuing at the CAC plants. The Mustang program may now be extended for another year until proposed types go into production.

► British helicopter work agreements, from over 250 motor miles in East Angles, are showing extensive interest in that, to date, 96 percent of schedules have been completed in 10 days and night flying operations. The report comes from G. Colin Cooper, general manager of the Helicopter Unit of Great Britain, now at the United States studying this nation's helicopters and gathering a library of U. S. helicopter development information.

► British have been having trouble with the efficiency of their new night fighter radar, the A1M19 "jack-knife" system. Feature of this new radar device is to project gratings, arcs, and target as the visibility is that the pilot need not remain on duty. When first contact is made, "jack-knife" A1M19 concentrates search radar to aim pilot and theoretically the search fighter and intruder bomber are never needed until the fighter pilot disconnects the auto-pilot.

CAA and Pilots Split on Lighting

Argument over approach aids, once thought settled, flares again as federal agency promotes own system.

By Robert Harte

Sheep conflict between the Civil Aeronautics Administration and the airline pilots is developing over a proposed increase of high intensity approach lighting standards set last year.

These standards were approved by the Air Force Navy-Coast committee of the Astronomical Board on existing ground and airborne visual aids and equipment and installations. They called for a double row of parallel lights extending 3000 ft. from both sides of the runway.

Red and Yellow—Lights in the left hand row were to be red with those on the right to be yellow. Only the left row was to be installed at end aerodromes, due principally to the strong industry support filed by the Air Lines Pilots Assn. and backed by Air Transport Association and Civil Aeronautics Board representatives on the airport lighting committee.

These standards were admirably an interim proposal until an exhaustive light test program could be conducted on equipment then available and new types of approach lighting still in the developmental stage. This light test program has been concentrated at the Landing Aids Experimental Station, Aeronautics, under administrative sponsorship of CMA.

(For detailed descriptions of the various high intensity approach lighting tests being tested at Awaia see *AWAIAW* 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841,

Symposium Report—LAMES recently submitted a summary report on the first three months of 1985 light sensor tests consisting of some 300 light weather stations using an system of high intensity approach lighting. This report concludes that the summative of the light sensor tests is to test only the light sensor and not the approach lighting system. The report also points out that the CAA requires that the approach lighting system be developed by the FAA. The FAA is chief of the lighting section of the airport development division of CAA's technical development office. He is also chairman of the Aeronautics administration panel, which directs the LAMES program and a member of the CAA's lighting subcommittee. CAA not only directs the direction of Aeronautics March.

Second priority is recommended for further tests on the parallel row systems using both Barlux (Lase Metallurg Co.) and American Gas Accumulator Co. (AGA) lights. Third priority is urged for a single row lighting light systems with Solvima and Westinghouse equipment. The Solvima system has been transferred to Arcata from Newark where an inc. pilot used it experimentally.

Writinghouse systems, similar to the one now installed at New York's *Elleworld*, is under construction at *Acorn* and was expected to be ready for test work early in November.

► **Slope-Lane Passed**—The LAHS summary report's high praise for the CAA-PennDOT slope lane system stirred a sharp reaction from airline pilots represented by both the Air Line Pilots Association and the Air Transport Association. Both groups favored the single row and left-hand installation as an obstacle system and leaned toward the single-row barrier type for a dual system. Their attitude was based primarily on experimental use of the Spivey's flashing lights with ocean lanes at Newark Airport.

A delegation of airline chief pilots headed by John Gill, chief pilot of Eastern Air Lines and NIA representative on the lighting evaluation committee, went to Ansett after submission of the LINES summary report to fly the slope back up.

The discussion on the system *did* lead considerably from the LAES to port Airlife pilots and that while the slope line system worked well in clear weather when the critical line of lights was visible, the system *could* be seen, they were not sufficient to assist a pilot with the runway. They also noted difficulty in identifying the right and left hand rows of the slope line lights. They also questioned the practical installation of the slope line at many major airports due to human difficulties. Ernest Corbett, of American Airlines, and ALPA members of the airport lighting evaluation committee, supported their con-

► **Report Quoted**—The LAFFS report had the following comments on the slope line system:

With the C-47 and equivalent aircraft the limit of performance success (50 percent or better) has not yet been reached with ceilings as low as 90 ft and visibility as low as 1/2 mile. With single engine aircraft, failures occur only in well-defined conditions of extremely restricted ceiling and visibility apparently because the task is forced into ability to make up by good maneuverability that enables the pilot to cast glances right and left while "faded out."

The 3-15 report blamed lack of success for the slope loss system in tests using a B-37 on the poor visibility of a foot a pilot downward and to the right in that type of plane. LAES reported the slope loss system had good identification, characteristic, but a satisfactory distance indication from the end of the runway good night or left deviation indications for the C-47 and for its satisfactory for the B-17, good altitude indication for the C-47 and for the B-17, good directional guidance and for its residents.

► **Controversial Points**—One of the strongest points of contention between the airline pilots who, by CAA calculations, do 75 percent of the instrument weather flying in the United States, and

The lighting engineers who have a strong voice in the Arcata project, is whether attitude, distance and rail guidance is necessary as an approach lighting system. The pilots contend the primary job of approach lights is to provide them with positive information as to the approach line and to line them up with the runway before they reach it. They prefer to rely on their cockpit instruments for attitude, distance from the runway and rail guidance. The lighting engineers, on the other hand, are striving to put all

Audubon pilots who recently flew at Acushla also criticized the Sylvaux installation there. They pointed out that at Newark the 2000 ft Sylvaux system had 48 light units, and that other airports

For light levels above 1000 lux, the observed data distributions were strongly skewed by the use of additional units. This content that the Sydnex translation. Accura was only 30 units in a 1000 lx translation. According to their recommendations the Accura distribution should have 58 units to provide the required intensity. They were also critical of the LARS single-unit metric but its limitations in light levels below 1000 lux mean lights with red filters were not instead of a high intensity approach.

■ **Seek New Agreement—**After objective of the Anas high intensity approach light tests to be conducted that first can be used in the Department of the Air Force-Navy-Civil lighting committee to determine a final standard for approach lights, CAA has spent \$200,000 to two sets of AGA and back to security approach light for installation at Washington National and Los Angeles International airports. In cooperation with the AIC, Nelson stated, "CAA recognizes reflected that they would drive lettering contracts for an additional 20 approach light as well as the first 10 approach light" until a new AIC standard was set.

They also indicated they were hopeful of getting ANC agreement on the CAA. Persons who lead work in the standards approach lighting system. An International Civil Aviation Organization group will meet in 1995 to determine international approach light standards. CAA hopes to have a firm U.S. stand to carry out that meeting where self-consistency is expected from the British Civil Aviation Authority.

► **System Comment**—Following are LAES summary report comments on the other systems tested at Auroa:

- **Shogun**—At the visibility limit recorded by the airport lighting evaluation committee, no appreciable differ-



Hiller Helicopter Gets Certificate

Fourth approved type certificate ever awarded a commercial helicopter has been granted by the Civil Aeronautics Administration to 23-year-old Stanley Hiller's United Helicopters, Inc., for its Hiller 360 utility aircraft.

United is the first company in the west and the third in the nation to get a helicopter ATC. Others are Bell Aircraft (the first) and Sikorski, which has two models certified.

With the premiums of a new \$1.5 million insurance stock issue, Hiler's company plans to go into immediate production of the three-plate 360. The goal is optimum: a selling price of about

less than \$20,000. Miller thinks he can do it because of product simplification and the fact that the usually complex color system is reduced to seven components that can be cast rather than formed.

United Helicopter's prototype is for the open cockpit model shown hovering over the Golden Gate Bridge at San Francisco, near company's plant at Palo Alto. For the time being, that's what the production model will look like. If future demand justifies an enclosed cabin, Hiller's firm will produce it, but the craft, of necessity, would have to be re-certificated.



FIRST DOUGLAS FIGHTER

Short Navy masonry credited XPB-1 as "our Douglas Navy fighter," but this plane shows Douglas XPB-1 of 1911 which was also a two-seat fighter, one of four competing designs of the period. Powered by Pratt & Whitney R-1535-64 Twin Wall Swallow engine of 700 hp., the XPB-1 had 204 mph at 10,000 ft. It weighed only 6730 lb. but cost

and nos. 38 and nos. 50 did machine gun work and a flexible 30 in our cockpit. The continued flying until 1939, when it was scrapped. Now I wish that neither Doug (in XPD-1), Berliner (over XP708), Virgile (XP50-1) nor Curtis (XP12C-1) was good enough to warrant leaving and abandoned two-seat fighters also.

cues can be detected in the negative performance of the barbed pattern and the one-to-one (red-light course light) configuration. Random failures were encountered under all test conditions, unless a definite actual ground plane is visible to the pilot on both day and night operations. Photo observations on all phases of these systems were satisfactory except for directional ground race which was fair. Operational times were recommended at 700 h, rolling and half mile visibility.

• **Two painful ties**—No appreciable difference can be detected in the respective performance of Rethw and MGA versus Piles' comments reflected as:

satisfactory attitude to formation; good directional guidance; left cell guidance; and fix to satisfactory lateral deviation indicator and distance measurement. Operational surveys for C-47 and single-engine aircraft were 4 mile visibility with zero ceiling and 3 mile visibility with 100 ft ceiling for day but for B-17 3 mile visibility with zero ceiling and 4 mile visibility with 100 ft

only). For night operations 100 percent increases in revenues are indicated.

• **Sylabsids flashing lights with moon lens**—Podocarpus machine induces in all test conditions unless natural ground plane visible at the middle ILS marker. Pilots' comments indicated excellent identification, fair to unsatisfactory distance measurement; disagreeably unsatisfactory left and right guidance, unsatisfactory altitude indication for directional guidance and unsatisfactory roll guidance. Operational success suggested for all type planes used at Arara were 200 ft ceiling and 5 mile visibility for both day and night.

The report also noted "confounding stereoscopic effects on propellers" that made some pilots to think their propellers are feathered. When the fisher is used superimposed on the left hand side of two parallel row matrices fishing light comes in diameter of rotation due to the forward travel of the fishers to the left of the pilot and the seaward trailing of the helix to the right now.

ENGINEERING



Wright Aircraft Corp. is testing its 5500 hp T-35 Typhoon turboprop at R-17 near "Nite" gas turbine stock under testing.

The T-35 installation in the R-17 accelerated movement of the flight deck at, entrance of nose, and strengthening fuselage.

New Propeller Engines for the Air Force

Combining best features of jet and reciprocating units,
Wright and P&W raise power plant performance.

By combining the turbojet with the reciprocating engine, engineers have long been convinced that a new engine could be created with the advantages of each and without the disadvantages.

The gas turbine is the most efficient way known for the conversion of the energy in low grade to mechanical work. The jet engine is the most effective method known for the acceleration of a fluid to high velocity. This supercharging engine is the most efficient engine in existence for the conversion of chemical energy to fuel to mechanical work. And the propeller is still the most efficient method of converting power into thrust.

Engineers in the U. S. have been working for some time last years on these principles and only in the last few days have the results of these efforts been officially released for publication. Pratt & Whitney and Wright Aircraft have taken two entirely different approaches to the problem but both have come up with engines that are substantial improvements over the wartime reciprocating engine.

Wright's T-35 Typhoon turboprop takes turbine thrust generated by the hot gases and puts it into a propeller in series of a high speed jet thereby utilizing the high efficiency of the propeller in a third position. Wright's new Turbo-Cyclone 13 offers the advantages of three gas turbines by sending output back to the engine crankshaft.

The Pratt & Whitney R-1335 V-17 engine represents a distinctly improved version of the powerful Warp Major to which a variable-discharge nozzle has been added to provide jet thrust.

This latter direct nozzle about 500 lb. thrust in the engine (on a total of 1200 lb. thrust in the Boeing B-54 in which it is installed).

►Design Steps—First step in design of the new model was removal of the original driving supercharger and supercharging driving mechanism, a saving of power, weight and complexity that increased the takeoff power of the engine to well over 4000 hp, a 15 percent increase. The additional power required strengthening of the crankshaft, piston rods, bearings and other internal parts.

Full conception of the new engine has been achieved by the use of direct fuel injection equipment. Jet engine design injection pump equipment in each cylinder is improved fuel distribution and more accurate control of fueling when producing the reduced fuel consumption. In addition, the new low pressure, high-frequency ignition system is used. This system was developed by Bendix Magneto division of Bendix Aviation Corp. and utilizes transistorized spark plug and a transistorized spark distributor unit.

►GE Superchargers—The General Electric C1002 turbo-supercharger is used to provide high density air through an

intercooler to the air entering and at high speeds, enabling the B-54 to develop sufficient power for operation above 40,000 ft. An innovation in the new engine and one from which it derives its name is the use of a variable-area nozzle on the turbo inlet.

Whereas previous turbo installations have exhausted the hot gases to the atmosphere, the new design expands these gases through a nozzle to provide the jet thrust. From this Variable Discharge Turbine comes the VDT name.

The variable area nozzle is automatically controlled through a pressure-operated actuator which maintains a constant relationship between turbine and atmosphere pressure.

By control of the exhaust nozzle area, control of the back pressure on the turbine is obtained. This in turn, determines the amount of supercharging given the intake air furnished the engine and, therefore, its power to a considerable extent. Direct control of engine output is, of course, determined by the fuel injection system.

►Closed System—The VDT is virtually a closed system resulting in operation of the turbine and jet nozzle at all times. For this reason engine speed cannot be reduced or increased and it makes up to about 3000 ft. to prevent excessive centrifugal pressure. This station also extends to the jet nozzle, which are in excess of the takeoff and climb speeds of the B-54. Thus, the new engine does not exploit the full advantages of the new VDT engine until an altitude of 3000 ft. and an speed of 175 mph are reached.

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MANUALLY OPERATED 4-WAY SELECTOR VALVES



High flow capacity—low pressure drop—light handle loads—compact radial design are proven advantages of Bendix Profile AN-type 4-way valves. They are available for both 3000 and 1500 PSI systems.

Valve 405843 pictured here is a 5000 PSI equivalent of AN 5213-1. Although rated at 5.5 GPM under Specification AN-V-4, it can handle considerably greater flows without excessive pressure loss. Flow areas are oval in construction, that further contribute to higher efficiency without increased size or weight.

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Correction factors for root and tip lift losses offer accurate means for estimating copter flight results.

In the past, use of charts and formulas to obtain hovering and transitional performance estimates for helicopters generally have given results which flight tests have proved too optimistic.

Application of this system to a large-scale lowering flight shows close agreement between performance predictions and experimental results.

* **Auditory Niche**—It is generally conceded that some tip-less should be considered in blade-stressing. Cervia made allowance for tipless in his Antelope blade lift distribution diagram, and a blade root correction was introduced later by the author.

It would seem logical also, to apply these factors in relation to performance characteristics.

In considering the probable nature of the life distribution over a capture blade in hovering flight, it is believed there is an analogy between the Lanchester-Pruett wing area conception for a fixed wing¹ and the operation of the helicopter blade.

In the bird wing, the wing-span is taken as a circle whose diameter is the span of the wing, and accordingly, in steady translatational flight, the plane of symmetry bisects the circle. For a helicopter blade, in its own flight, with peripheral velocity varying from zero at the centerline of rotation to a maximum at the blade tip, it was considered that a virtual plane of symmetry could be located at the radial position determined by the centers of blade chord lines corresponding to identical velocity squares. At this point, depth of the squariness would be a maximum.

It was further assumed that the variation of average from the maximum would vary alkalinically to zero at the blade root and blade tip.

Using a factor of 1.0 at the virtual plane of symmetry, allowance for blade tip and blade root losses is then made by applying the factor (as function of radius) corresponding to the proper blade element to the lift calculated for a given element. Blade root loss is

Insect, and also for 50 insects

It will be noted in the diagrams that the factor is zero at 10 percent radius, zero in practical helicopters, the blade root is usually situated inboard of this station.

For turbos, maximum lift for a specified power input is obtained when $(C_u)/(C_u^*)$ is a maximum. This would lead to relatively low tip speeds in obtaining the maximum hovering efficiency for a helicopter, and in the absence of two-speed transmissions, would impose a very serious limitation on forward speed because of tip-stall at the maximum blade.

For heaving, with a single-speed transducer, it is therefore the practice to choose a value of C_0 somewhat lower than that corresponding to $\{G_0\}/\{G_0\}_{\max}$ (say $\sim C_0 = 7$), and to use a small amount of wash-out from blade root to tip.

5-Step Analysis Employed—Using the strip analysis, with corrections for tip and root losses obtained from Figs. 1 to 3, a constant value of C_r may be chosen. The induced velocity and induced angles at each station are then calculated, and finally, along with total thrust and torque, the work-out required and load grading curve (based on derivatives of blade bending moments) are obtained.

The accompanying table shows the application of the strip analysis, incorporating the correction factors of Fig. 1, to a typical rectangular phenolizer, three-blade rotor of 40 in. diameter and solidity of .56, operating at a tip-speed of 300 ft/sec.

It is assumed that down thrust is approximately 2875 lb (giving a loading of 2.19 lb /sq ft. of disk area), and that all black surfaces will operate at a lift coefficient $C_L = 0.2$.

Increments of 10 percent index are chosen for calculation of elementary losses, with each station (col. 1) at the midpoint of these increments.

Correcting peripheral speed, πn , is shown in col. 2, and square of this value in col. 3. In col. 4 is given the correction factor F for a rectangular blade (taken from Fig. 1) and the clearance h , $h \pm \Delta h$ is shown in col. 5, with clearance drag, b , and D , in col. 6.

For a three blade rotor of solidity 0.6 and 40-ft diameter, blades chord is 1.26 ft, and total area, for 3 blades is 0.96 percent radius or $A/A_c = 3 \times 0.256 \times 2 = 7.54$ sq in. Value of $h \pm \Delta h$, for C_d of 7 and $\alpha = 0.0119$ is $7 \times 7.54 \times (0.0119)^2 = 0.00183$ or 0.00183 ft.

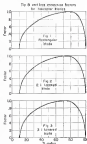


Fig. 5. Infrared activity of
tetraether ring— $\mu = 0$
40 in 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.



Fig. 6. Local gradient of
 $\nabla \phi(x, y) = \nabla \phi(x, y) - \nabla \phi(x, y)$
 rectangular $\nabla \phi(x, y) = \nabla \phi(x, y)$
 writing $\nabla \phi(x, y) = \nabla \phi(x, y)$



² Chief Engineer, Avco Corporation of America.

Hoisting Performance, Load Grating and Wash-out Required for a Rectangular Platform, Three-Blade Helicopter Rotor of 40 ft. Diameter and Solidity of .40

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
V_r	R	ρ	σ	$\Delta L/F$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$	$\Delta L/B$
10	100	0.000	77	2.4	25	37.7	9.7	9.11	4.0	83	9.1	—	—	—	—	—	—	—	—
20	100	10,000	31	21.3	36	47.7	14.9	9.71	10.0	10	10	—	—	—	—	—	—	—	—
30	100	15,000	25	19.6	31.0	40.5	11.1	9.71	10.0	10	10	—	—	—	—	—	—	—	—
40	100	20,000	20	17.7	27.7	37.7	9.7	9.71	10.0	10	10	—	—	—	—	—	—	—	—
50	100	25,000	15	15.8	24.0	34.0	8.0	9.71	10.0	10	10	—	—	—	—	—	—	—	—
60	100	30,000	11	14.0	20.0	30.0	7.0	9.71	10.0	10	10	—	—	—	—	—	—	—	—
70	100	35,000	8	12.2	17.0	27.0	6.0	9.71	10.0	10	10	—	—	—	—	—	—	—	—
80	100	40,000	6	10.4	14.0	24.0	5.0	9.71	10.0	10	10	—	—	—	—	—	—	—	—
90	100	45,000	5	9.0	12.0	21.0	4.0	9.71	10.0	10	10	—	—	—	—	—	—	—	—
100	100	50,000	4	8.0	10.0	19.0	3.0	9.71	10.0	10	10	—	—	—	—	—	—	—	—

Performance Data from Table:

Torque $T = (950 + 800) = 1750 \text{ ft.-lb.}$

Power $P = 1750 \text{ ft.-lb.} \times 100 \text{ rpm} \div 5252 = 33.3 \text{ hp.}$

Thrust $T = (2750 + 450) = 3200 \text{ lb.}$

Thrust $T = 3200 \text{ lb.}$

Thrust $T = 3200 \text{ lb.}$

$\times 7.4 = 24.2 \text{ ft.}$

Angle of flow at the rotor disk, δ , resulting from V_r and U , is shown in col. 9.

Flows of lift and drag are broken into components which act in the plane of and perpendicular to the rotor disk. When components in the disk

plane are multiplied by the area from coefficient of rotation in the station under consideration, we obtain elements of torque (cols. 10, 11).

Components acting parallel to the axis of rotation of the rotor are given in col. 12. V_r corresponding to each station in col. 8.

By momentum relations, $V_r = 20 \sqrt{1.5 \Delta L/F}$ (column 10).

Angle of flow at the rotor disk, δ , resulting from V_r and U , is shown in col. 9.

Flows of lift and drag are broken into components which act in the plane of and perpendicular to the rotor disk. When components in the disk

Heavy Extrusions Now Stretch-Formed

The stretch-forming operation, used widely in the past few years for bending sheet metal parts, is now being employed for the forming of heavy extrusions in aircraft.

A subcontractor to several aircraft manufacturers—Vic Products Industries, Inc., Hollywood, Calif.—has been using two Halford stretch presses for forming North American B-45 jet bomber landing trimmer and other extrusions.

Blade of the extrusion are clamped between the two components of the two-roller extrusion which are mounted on heavy bearing arms, and after alignment the extrusion are engaged to give tension in the part. This tension



is slightly below the elastic limit of the extruded material.

blade-sides. It is interesting to compare this chart with diagrams showing calculated downward shock experimental shock points.

Finally, Fig. 5 shows the blade load in lb./sq. in. to the blade, useful in determining blade bending moments.

References

1. Warner, Edward, Jr. *Airplane Design*, 2nd Edition, Pt. 2, McGraw-Hill Book Co., New York.
2. Goss, Robert, S. An Investigation of the Airflow Underneath Helicopter Rotor, *Journal of the American Helicopter Society*, December, 1946.

Following the pre-bending, a steel cylinder is engaged to swing the extrusion in such a manner that the stretched extrusion is bent around the form.

This method permits repetition of extrusions over the permanently hot "cold-forming" method. In the stretch-forming procedure, equal pressure is exerted at all points in contact with the die thus eliminating warping at the point of curvature and preventing accumulation of time dimensional tolerances.

The extrusion, being under tension approaching the elastic limit, attains permanent set during the operation, thereby preventing spring back, warping and dimensional variations.

The material is work-hardened only slightly, but the hardening is evenly distributed over the entire length, eliminating localized strains. Both bending

strength and yield point are usually considerably higher than the original values.

A major benefit is reduction in tooling costs and great saving in time over the previous method. Dies are made of Monomet, laminated sheet Kelinox or steel, depending on length of production run.

Since the stretch-form method is common but not operation, output is estimated to be as high as 70 parts per hour. After stretching and bending operations have been established, the machine produces almost parts up with.

Plastic Plane

Mayland firm working with new method that resembles casting.

A new process aimed at the fabrication of a reinforced airplane fuselage is under development at the General Aeronautical Laboratory, Cambridge, MA.

Recent research is concerned with selection and fitting of various types and combinations of thermoplastic resins.

Plans call for the building of a prototype of a full size plane for studies

tests to establish a basis for structural analysis and formulae. Once the reinforced procedure is proved, work is scheduled to begin on the airplane project. The new process and the manufacturing methods are reported to be very different from the most, performed at Wright Field in connection with the plastic construction for aircraft parts.

Models for heat-treated of using best and previous to make two reinforced glass cloth, the new procedure will use molds in a method approaching a casting operation.

Laboratory work is also shown that a chemical resin (using the heat of a chemical reaction instead of externally applied heat) in the form of an area or surface (colored) may be possible.

Also, results of tests show that it may be possible to effect automatic distribution of reinforcing material throughout the resin. This material is reported to be new in relation to reinforcement of aircraft structure.

The wings, including skin and spar as well as the structure and tail section will be constructed by the molding process. The surface is expected to be plastic and free from wrinkles for maximum aerodynamic characteristics.

Time-Saving—The most promising advantage of this type of construction is claimed to be great reduction in time.

hours consumed in manufacturing and the reduction of time required to develop a new type or model of aircraft and get it to the main production stage.

In comparison with present sheet metal construction requiring many thousands of parts and fasteners and extensive drawing, drawing, analysis and checking, structure of the reinforced plastic plane is expected to have very actively few parts—perhaps under 30, depending on type of craft.

Previously many tests are reported to have shown the new reinforced plastic aircraft to be non-thermal, resistant to high speed, high speed, high speed and high speed.

Jet-Powered—Several designs are being considered for the first airplane, and are dependent, however, on the possibility of release by the delivery of test results. A new airplane design has been developed by Don Goldsby, director of the lab, who has been associated in the past, as the managing, department of, General Aeronautical Laboratory, Cambridge, MA. Wright, McDonnell and Aeronautics division of Armstrong, Cork Co.

It is possible that a general type plane will be used for the original research, using the new NACA low drag series of airfoils and full span flaps with special aluminum to combine high speed flight and low landing speed.

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Radial-Type Motors, 2-10 hp (100-150 rpm)

Variable-Speed, B-C Generators, 2-10 kw, 15-20, 40, 600 rpm

Variable-Speed, B-C Generators, 2-10 kw, 15-20, 40, 600 rpm

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Flash Light—provides a flashing light for use in conjunction with a separate light system to give the user a continuous range of 1,000,000 to over 1,000,000,000.



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Standardization Manual For Drafting Procedures

Standardization of aircraft powerplant, propeller, component and parts drawings, to make for greater production simplification, is being accomplished by manufacturers through the use of the Aeronautical Drafting Manual issued by the Society of Automotive Engineers.

SAE, quotes engineers as saying one of the manual's major design drawing changes and has begun the standardization language of the blueprint.

Latest manufacturer to adopt the standardization recommendations is Packard Aircraft Division, Toledo, Ohio. More than 1000 firms are using the manual either in part or in whole. At least 40 companies have adopted the manual's recommendations that drawings given to them in drawings received at the end of an aircraft.

The manual is also being used by engineering colleges as a textbook.

Rift Made in Plane-Wide Bargaining Arrangement

Plane-wide bargaining on the metal industry has been ended by the International Brotherhood of Electrical Workers, A. F. of L. members, employees who deal with one union in regard to production and maintenance workers can expect the IBEW to try to convert a craft unit of electronics and get help from the National Labor Relations Board.

At least unity was accorded by IBEW at Lockheed Aircraft Corp. plant at Van Nuys and Burbank, Calif., where the International Association of Machinists, mechanical industrial district Lodge No. 717, has held a contract covering all shop workers since 1977. The A. F. of L. union got NLRB to grant it an election among maintenance technicians, then beat IAM by a vote of 33 to 24.

New Lockheed will have to deal with IAM as to its production and maintenance union, here (except electronics and work IBEW as to the electronics).

Other companies at which NLRB has approved a special bargaining unit of electronics include Douglas Aircraft Co., Boeing Aircraft Corp., Lockheed Aircraft Corp. and Consolidated Vultee.

Strikes for splitting up bargaining units stem from a Taft-Hartley law provision that the NLRB may not decide that a craft unit is inappropriate because of some prior ruling in that effect unless a majority of the employees on the proposed craft unit vote against separate representation.

NEW AVIATION PRODUCTS



Multiple Drilling Tools

Speed, accuracy, and maximum of operator fatigue in multiple drilling are claimed for Jetdrill drills produced by Kifer Tool Co., Grand Haven, Mich. Late models of Jetdrill tools to afford 34 speed conversions of stationary and portable units for holes up to 1/4 in. in mild steel, aluminum, brass, or plastic. Tool weights range from 31 to 25 lb. Jetdrill is a combination of an drill, an cylinder and hydraulic design and feed control assembled in one housing and arranged for loading progressively in 10 or per second rate before.



Time Delay Unit

Applicable in aircraft, scientific and industrial fields, heretofore called "Time-lag" has been fitted with coil spring back in coil by DeLuxe Div.,

Cook Electric Co., 2100 Southport Ave., Chicago 16, Ill. Settings are available from 1 sec. to 2 min. duration. Unit is operated while in operation when subjected to 12 G. acceleration. Motor current can be varied from 6 to 115 v. a.c. or d.c. Timing tolerances are maintained when device is subjected to ambient temperature changes from -65 to 160 F. range, from 5 percent at 1 sec. to 30 percent at 115 sec. Weight is 3 oz.



For Profiling

Suitable for profiling blades, model sections, face blocks, and tools, duplicating attachment for profiling machines is produced by Aerobit Development Co., 1912 Lincoln Ave., Pasadena 3, Calif. Profile in the vertical direction is obtained by counterbalanced stroke motion and lifted by the master cutting in done by two high-speed pneumatic cylinders with ball and roller rollers. Level in the other two directions is obtained via movement of rotating machine table, which is also product of vertically moving arm.

"Free Wheeling" Tube Cutter

New tube cutter, No. 274-E, with ball bearing action is announced by Imperial Iron Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill. Tool is designed for use with copper, brass, aluminum, Babbitt metal, lead, tin and lead tubing, hard or soft temper, and will cut all sizes from 1/4 to 1 in. in. 4-E. Free-wheeling action in rollers makes it possible to move around fast without waste of tubing. Aerobit feature is noticeable locking member for use on tubing when it is not, holding end of way when not in use. Tool feed mechanism is contained so that threads are protected against dirt and damage. Body is high strength aluminum alloy.



B.C.-A.C. Chopper

Single-pole, double-throw, electro-mechanical chopper actuated by 500 volt-ampere line, 25 Hz. 500, North Boston 27, Mass., converts pure d.c. to pulsating d.c. at 25 cps. that output of 1000 watts, 250 v. a.c. or d.c. at 25 cps. may be amplified by a.c. At 25 cps. it converts a.c. to d.c. Contact rating is 125 v. a.c., 10-600 cps., but it's stated this may be increased by 20% without damage. Unit is hermetically sealed. Seal height is 21 in., diameter is 11 in.



For Aerial Photography

For use by engineers, photo camera, and other uses of vertical aerial photography, Model P-271 folding camera lens, is announced by Fitchfield Camera & Instrument Corp., 5505 Van Wyck Blvd., Jamaica 1, N. Y. Three legs fold into corners of dust body when not in use. Manual zoom having 41x focal length and 25 power magnification, overall set of lenses and an adjustable horizontally over range of 50 to 72 mm. Unit stands 4 in. above pins. Overall dimensions are 5 1/2 x 11 x 4 in. Weight is 75 ounces.

On the Lockheed Shooting Star



One of the toughest flying problems ever encountered was the windshield of the Shooting Star. It was solved by Pittsburgh's specialists, with the clear glass of bird-resistant, bullet-resistant Pittsburgh Safety Plate Glass.

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"Pittsburgh" is continuing an aggressive policy of product development, applying proved engineering principles to the solution of new problems as they arise. We are now applying the same industry with laminated transparent plastics, photographic glasses for aerial use and previous ground bullet-resistant glass for ground purposes.

When you need Safety Glass for airplanes, bring your problems to "Pittsburgh." Our research, research, research and years of experience in making quality glass are your assurance of satisfaction. Pittsburgh Plate Glass Company, 28224 Grant Building, Pittsburgh 18, Pennsylvania.



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FINANCIAL

National Case Has Repercussions

Speculation on whether airline network overhaul is brewing follows CAB dismemberment proposal.

Considerable conjecture continues to surround the action of the Civil Aeronautics Board in suggesting a possible dismantling of National Airlines. This bold proposal has created considerable confusion among the air carriers as to the possible consequences and the ultimate objectives of the Board.

Some observers see an effort by the Board to assume the initiative in attempting to reshape the airline network, with fewer but stronger carriers emerging. Others believe it represents an isolated instance with CAB attempting to correct an undesirable situation created by a strike-related airline.

► **Likelihood**—There may be some truth in both conclusions. Of greater importance, the likelihood of accomplishing either of these objectives by the present action is considered very slim. The Board may prod, but it appears that it cannot legally force National to dismember itself.

Almost unnoticed in the general action is the shift in the Board's philosophy toward suspension of certificate routes previously granted. In March, 1947, largely at the behest of then Chairman James M. Lunde, the Board instituted an investigation of whether it was in the public interest to suspend certificate routes previously granted. Changes and Status Act (enacted in the California case).

► **Dispute**—In a concurrent case at issue, Lunde strongly dissented from the majority decision granting C & S a five-year route increase amounting to 95 cents a place mile. In this instance, Lunde proposed to use the rule of rule pay as a device to encourage the airline to improve its service and to a classic depiction of route change.

The majority of the Board disagreed with this approach, maintained the high and steady rate and in a subsequent action, in April, 1948, announced the proceeding involving the investigation of the route concerned, continuing the previous action. The majority was reluctant throughout to suggest an arbitrary penalty, and in a subsequent action, in April, 1948, announced the proceeding involving the investigation of the route concerned, continuing the previous action.

► **Not Passed**—Should the Board continue in the attempt to reshape the airline network, it will be necessary to consider the possibility of a new route investigation, questioning the arrangement of their route structure. This may be the Board's answer to the attempt to dismember the

carrier caused by the rapid depletion and liquidation of route mileage, granted in earlier regulatory times.

CAB's statement that the National investigation will further its study of the transportation system leads evidence in the belief that after route change costs are being given some consideration, it is all probability, however, the Board may be inclined to move on towards an air carrier move and the legal questions surrounding the National investigation are more completely resolved.

► **Research Order**—Almost overlooked in this pattern is the Board's appointment of a Middle Atlantic Area, which included a previous order permitting Capital Airlines to allow any new service over certain key airports of its route between the Chicago area and New York. The area is highly competitive by virtue of the existence of other air carriers.

To add to the confusion, Capital is continuing to make good on its previous order to allow a special investigation order which has the purpose of suspending the revision order until the Board completes its investigation of the carrier's right to permanent authority for such revision.

► **Procedural**—It is possible that the Board assigned the National investigation to provide that some into a new or series of changes. It is known that both the Board and National have been discussing a possible consolidation. Other carriers have also tried with the idea of merging with National. In all instances, however, it is believed that the question of joint has been the main stumbling block.

The Board action, rather than building an image, indicates, may have worth the entire effort. With National's route change now under way, the other carriers can be selected to accept an intangible asset which may be subject to considerable litigation.

► **Future**—Continuing to go to the CAB, the Board is in the process of determining terms for National's route. What are the "just and reasonable" terms to be paid by the other airlines for National's physical assets and equipment? Is this a "just and reasonable" term to be paid by the other airlines for National's physical assets and equipment? Is this a "just and reasonable" term to be paid by the other airlines for National's physical assets and equipment?

Further, should the Board continue its investigation of the National case, it may result in an obligation to assume such practice through "interim" and pay to the board.

The Board's investigation of the National case is a significant step in the restructuring of the airline industry, but it has opened up many questions with the ultimate results much in doubt.

—Sally Abelson



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SALES & SERVICE



Two personal planets have developed from World War II target drone planes, and they now get oneupers, whose amazingly profitable use is primarily as a sub-roboticized target craft, which likewise is a forerunner

of a pit ground plane. The sketch shows design study of the non-phase, which is being developed at Cal Aero Technical Institute, Glendale, Calif. Its 180-in. thrust engine also is being built there.

Cal-Aero Designs Midget Jet

Low-cost craft, suggested for possible military use as a drone, may show the way to a personal jet ride.

Forerunner of possible future jet-powered personal planes is a single place jet airplane design now being developed by H. G. Nicholas, director of design at Cal-Aero Technical Institute, Glendale, Calif. Powered with a 240 pound thrust-jet engine, also produced by Cal-Aero, the airplane is scheduled for completion within the next year, with engine tests scheduled early next spring.

A primary advantage of this plane would be the fact that the powerplant, out, a large factor in any transport-engine powered small plane, would be lowered because the engine was powered by the plane's main battery and was made simply from surplus supercharger parts.

► **All Metal—**Pratt designs calls for all-metal construction using a butterfly or V tail and a double taper wing. Air intakes for the engine are in the sides of the fuselage, just behind the cockpit; exhaust is at bottom of fuselage, forward of the tail assembly. Engine is behind offset.

Nicholson quotes estimated performance figures for the single master as top

speed of 240 rpm with cooling speed only slightly less, range of 315 min. 1360 ft/min. rate of climb, and fuel consumption of 75 gal/hr. Due to the light weight of the engine, the plane could be able to carry a larger proportion of fuel.

► **Wingspan**—Pines is to have 38 ft 39 in. wingspan, overall length of 17 ft 8 in. and overall height of only 5 ft 13 in. Gross weight is set at 1275 lb. Landing gear is all "bicycle" type, with two main wheels set in tandem along the centerline of the fuselage and two outrigger wheels on the wings for balance.

Originally driven up as a project for CalAqua engineering classes, the design is seen as an intriguing prototype for possible future construction projects.

◆ **Dodge** — Nicholson vaults the speedy engine plate as a possible target drive for military use, with advantages over currently used diesels and in its low cost and superior performance.

If certification can be obtained on the jet engine, manufactured of surplus type B supercharger parts, the engine could be produced cheaply enough to rent it

in selecting potential personal place
powerplant

► **Propellers.** No personal aircraft in the light-sport class has yet been developed with a jet powerplant, but the prospect of low engine cost has intrigued several designers in this field even since the first jet plane was announced.

Dr. T. P. Wright, vice president at Cornell University and former CAA administrator, predicted four years ago in a Washington speech that the eventual choice of a low cost personal plane propulsion would be a form of jet engine, when this type of propulsion had achieved the reliability necessary for personal plane engines.

Work on the plane has progressed to mockup stage. The engine is the latest in a series of small jet powerplants produced from surplus materials and is expected to possess endurance qualities considerably surpassing others developed at Cal Aero shops in the last few years of continuous development in this field.

Convair Gives Up Flying Auto Rights

Acquisition of the four-plant Consolidated Vultee flying automobile and all further rights to its development has been announced by T. P. Hall, designer of the airplane-auto, at San Diego.

Hall and that more than 500,000 had been expended in development of the (experimental) roadside phone, and that only some flight testing and minor engineering modifications remain before it will be ready for production. He is considering several proposals for its further development.

• **Contract Terms**—Hall signed a contract two years ago with Comcon for development of the roadable plane. After development expenditures were stopped by the manufacturer, the vehicle and its manufacturing rights reverted to Hall under the contract, when he resigned his engineering position with the company.

The big automobile melds two components: a modernized steel two-door sedan automobile with a body of laser-cut glass panels, powered by a 35.5-hp Chrysler engine mounted in the rear, and a light component, including wing doors, a rear window, and a rearview mirror and tail assembly, which attaches to the roof of the automobile for light. Fiat reports that light tests have been "very satisfactory," with the aircraft attaining a cruising speed of more than 100 mph. On the ground the car attains a top speed of 67 mph and travels 45 miles per gallon. Fiat will continue its development of the car at its research center in Arese, near Milan, and at its Turin plant. The car has been shown at a trade show.



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AIR TRANSPORT

Domestic Airline Traffic & Revenue Comparison of First Eight Months 1947 & 1946

Carrier	Rev. Pass Miles 1947	1946	Net Op. Income 1947	1946
American	518,913,000	516,741,000	\$-2,156,505	\$-4,353,293
Braniff	129,730,000	128,321,000	-871,398	-495,800
Capital	294,026,000	288,301,000	-1,916,411	-198,190
Chrysler & Co.	70,016,000	70,040,000	-496,401	414,813
Columbia	15,199,000	27,017,000	-109,864	1,600
Continental	98,161,000	10,121,000	-268,707	110,981
Delta	178,164,000	172,675,000	-208,374	399,124
Eastern	579,218,000	675,223,000	2,953,161	3,495,238
Eastern	18,760,000	17,986,000	120,217	15,362
Mid-Continent	53,791,000	62,596,000	195,602	-15,000
National	111,380,000	12,147,000	-338,120	-1,368,792
Norfolk	62,780,000	36,889,000	-419,247	-746,476
Northwest	235,640,000	216,511,000	-1,376,915	-2,715,691
TWA	315,170,000	919,640,000	-1,841,898	-2,000,089
United	786,697,000	761,195,000	1,635,408	-2,602,524
Western	113,611,000	75,740,000	36,782	-1,617,026
Total	3,666,014,000	3,817,651,000	\$-13,838,978	\$-11,498,497

* TWA income for August estimated.

Trunklines Look To Last Quarter

Carriers hope fare discounts and CAB action on mail pay will cut 1948 losses, now near peak level.

With four of the industry's "big five" for the end, the 16 domestic trunklines have taken semi-annual losses into the first quarter of 1948.

But the last three months of the year showed some improvement, even the same 1947 period, when DC-6 accidents and the subsequent grounding brought exceptionally heavy losses to American Airlines and United Air Lines. There is still some hope that the rules repeal of monthly airfares, and the discounts can lower 1948 passenger volume to last year's level. And CAB action on pending mail rate cuts may begin to pay the picture substantially.

Eight-Month Deficit—An American Western survey covering the first eight months of 1948 shows the 16 domestic trunklines with an estimated \$11,499,497 operating deficit. It is the same period last year, when losses were heading for an all-time peak of over \$20,000,000, the operating deficit aggregated \$13,838,978 for eight months. Net losses for this year have been mounting steadily since 1947 because the carriers are now getting considerably less benefit from federal tax carryback.

Passenger volume handled by the domestic trunklines in the first eight months of 1948 lagged behind 1947's level by more than 1 percent. Revenue passenger mileage aggregated 5,817,567,000 through August, 1948, against 5,954,614,000 last year.

United Air Lines, first to report on September 16th, announced that revenue passenger mileage was 6 percent under August and 11 percent below September of last year.

Profit-Making—Six of the 16 domestic trunklines were in the black on Sept. 1, 1948. Chicago & Southern, Colonial Continental, Delta, Eastern and United at the same time last year only Eastern, Mid-Continent and Western showed profits.

American reported the largest operating loss during the first eight months of 1948—\$1,399,771. In the same period last year its deficit was \$2,156,505. Other large domestic operating losses through August of this year were: Norfolk \$2,720,651, United \$2,602,524, TWA, losses \$2,697,890, National \$1,185,712 and Western \$1,017,876.

Monthly Losses—Record—Subsidies

profits have been shown in only two of the first eight months of 1948—May and June. In July, the carriers went into the red again with \$931,621 operating loss.

Record-even results were recorded in August.

September earnings may be the last in 1948. American, United and TWA are expected to show sizable profits. Chicago & Southern already has reported \$57,446 net income during the month of September.

ACH in Black—McConnell, American profit among U. S. flag carriers. The company announced a \$795,598 operating loss in the first half of 1948 with earnings of \$675,968 in July and \$678,518 in August. ACH's passenger load factor during the two months of July and August averaged about 69 percent.

TWA's business operations continue in the red. Following a \$2,694,106 deficit in the first half, the carrier reported a \$195,916 loss on its August income as July and another loss in August. Load factor during the two months—August was reported in slightly under 60 percent.

For American Airlines had profits on its Atlantic division during July and August on load factors averaging around 66 percent. But revenue passenger failed to offset full half deficit.

United, Western—Northwest Airlines a strong well on its ground up. After showing \$153,515 net operating income during the first six months of 1948, it reported a \$146,758 profit in July and \$213,194 in August, when passenger load factors were averaging around 73 percent.

United Air Lines' losses in Texas continue to be a non-monthly money-maker. Operating profits of \$79,631 in July and \$92,870 in August make them record and a first half deficit of \$115,930 to last year on this line moved from 80 percent in July to 96.5 percent in August.

Transocean Signs Contract To "Organize" Carrier

Transocean Air Lines has signed a \$1,000,000 contract with P&A Air Ltd., to furnish the Pakistan route with planes, crew and scheduled personnel. Contract marks the second time that Transocean has helped a foreign airline to set up international operations. A similar operation was recently completed in Pakistan and will be provided personnel for Philippine Air Lines.

Agreement calls for delivery of four DC-4s (two DC-3s) and the furnishing of crews to fly for P&A Air. Transocean also will assist in training P&A's flight and ground personnel. One DC-4 already has been delivered.



Public school teachers from all parts of Michigan pose in front of the chartered Capital Airlines DC-4 from Grand Rapids in New York. As part of this study of air transport

PCA Leads in Charter Business

Carrier builds up a bustling trade in contract traffic to help offset decreases in scheduled business.

Capital Airlines (PCA) is doing high as the nation's leader in drawing up business in placed last through charter sales.

Ranking fifth in total operating revenue among the 10 domestic airlines last year, Capital said it had an estimated transportation income, plus gas, fuel, and maintenance, of \$11,000,000. This for 1948, Capital occupies first place in charter receipts by a fairly wide margin.

Last year, Capital took in \$277,211 from its contract and charter traffic. During the first nine months of this year, the total was over \$11,000,000, with the fourth quarter showing the gain, not expected to yield perhaps \$10,000,000 more. Capital's increased non-scheduled business has been developed at a time when its own scheduled traffic, like that of the industry generally, has been below last year's levels.

Enterprise Shows-While Capital's highly profitable charter activity will account for less than 5 percent of the company's total operating income in 1949, it is of major significance to a carrier striving to keep its losses at a minimum pending Civil Aeronautics Board review of its rates. The company's enterprise is being used to offset losses in the percentage of efficient management in the which Civil Aeronautics Board will not be too far off.

J. G. (Bud) Upgahrd, manager of Capital's special events section, says the carrier's source of charter business is not individual and corporate athletes' teams

and personnel which otherwise might be able to keep busy, especially over weekends.

October contract from non-scheduled flights is expected to aggregate about \$50,000—more than a quarter of Capital's total charter income this year. During the second weekend of the month, Capital made the following groupings: DC-4 charter trips, Standard Oil Co. of New Jersey, Washington, D. C.; Texas University of San Francisco football team, Chicago-DePaul University football team, Pittsburgh-Birmingham, Ala.; Cleveland College football team, Anderson, S. C.; State of Ohio, Western University football team, Detroit-Washington, D. C.; University of Richmond football team, Richmond, Va.; Cincinnati, S. C.; and the San Francisco State professional football team, Erie, Pa.-Baltimore.

Under Business-Upgahrd is applying for "motor" business as a natural concomitant of athlete team flights. Besides problem signals, he is doing business with professional and collegiate basketball, hockey and track teams. Capital's charter rates are \$2 a plane mile for DC-4s and \$1 a plane mile for DC-3s. The carrier does not operate unscheduled non-scheduled flights excepting competition for greater charter traffic. Most potential customers Upgahrd advises, prefer to do their business with the regular scheduled airlines.

While Capital leads the industry in domestic special flights, other airlines also are reporting increased business in the field. **Danville-Will** fly five southwester and western (Dallas, Texas, Oklahoma, Oklahoma City and Tulsa) to twelve points in nine states from coast to coast this season. **Continental**, like scheduled to carry 15 western college and amateur football teams to games as far away as Washington, D. C. Type will be made with Convairliner and DC-1 equipment. **Aviation** and **Continental** the 12-man University of Miami football team to Detroit on Oct. 15 and the next day flew to Washington, D. C., to meet the University of Maryland (one of its five opponents) in its game with Duke.

TWA-Will fly five All American Football Conference teams (1,989,735 passenger miles) and three National Football League squads (106,154 passenger miles) this season. In addition, TWA will carry six university football squads to out-of-town games.

United-Argues it will fly a second number of gridders teams this fall. It is contracted to carry 13 college football squads on 17 roundtrips to all parts of the country.

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Non-scheduled Transport Service Certificated Domestic Lines*		
(For 7 Months 1948)		
Carrier	Revenue	Pass Miles
Capital	\$81,147	1,100,000
United	70,615	592,000
Western	62,585	955,000
Eastern	41,475	640,000
American	39,072	701,000
TWA	25,184	355,000
Norfolk	15,690	511,000

*As of July 31, 1948, after Capital and Western, United, Eastern and Norfolk report included.

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Family Fare Plan A Success, Says AA

American Airlines' last-of-the-week family fare plan is going over with a bang, according to company sales officials.

American personnel have been "delighted" with response about the arrangement, which went into effect last month and is designed to attract last before during normally slack periods. Under the plan, fares and children under 21 accompanied by full-paying passengers can travel at last fare if their flight starts between Monday and Wednesday.

Boston Branch-AA's Boston office reported that 50 percent daily took advantage of the plan the first week it was offered. During the second week the number of family-fare reservations jumped to 80 daily, and during the following two weeks the number reached about 100 daily.

Since the total number of persons traveling out of Boston on American averages around 300 daily, the family fare plan already is accounting for one eighth of the reservations. Boston sales personnel have expectations that the rate to increase.

Other Cities-American's Los Angeles office reports that family fare reservations were then doubled during the second week of operation, with nearly 300 families taking advantage of the low rates. Between Sept. 15 and Oct. 15, AA's Cincinnati office booked 380 family fare parties of two, eight parties of three and two parties of four.

During the first four Mondays in which records of family fare bookings were kept, 105 persons took advantage of the arrangement at Cincinnati. As a result, weekly peak Monday business increased 7 percent.

Ten Nations Financier Jetland Air Facilities

The International Civil Aviation Organization has announced an agreement whereby ten nations will finance air corporation facilities on Jetland starting next year. Estimated costs of \$600,000 are easily met by divided U. S. 46.7 percent, Belgium 17.5 percent, Canada 14.9 percent, Britain 9.9 percent, Canada 7.1 percent, Netherlands 4.8 percent, France 4.1 percent, Sweden 2.6 percent, Belgium 1.3 percent, Denmark 1.7 percent and Norway 1.7 percent.

Jetland will be paid about \$1,000,000 for expenses incurred in maintaining an international facility—including weather reporting and forecasting stations, radio-telecommunications, navigation aids, and telecommunications networks—from 1948 until the end of 1949.

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CAB Again Rebuffs Nonskeds

Board rules out exemption to cover scheduled second-class service; Standard wins court victory over AA.

Unaffiliated transcontinental aircraft operators have taken another setback from CAB as their campaign for broadened operating privileges, but at the same time they have won an important legal triumph in the federal courts.

The Board unanimously denied the petition of Standard Air Lines, Viking Airlines, and Airline Transport Council for extension of their exemption as third-class airlines to permit scheduled service (Aerospace Week Aug. 9). CAB made clear that its decision should not be construed as a denial of need for such type operation. But it emphasized that approval of the need for scheduled second-class service should be developed through regular certificate proceedings, not through blanket exemption petitions.

■ **Monocorporation.** *Issue.*—The application of the three-step operation need as apparent monocorporation of the intent, purpose and interpretation of the nonscheduled exemption—a monocorporation which seems to be closed by a substantial number of carriers engaged in similar services. CAB refused. The Board pointed out that the nonscheduled exemption permits common carrier transportation of persons and cargo only in the private interest of individuals between two points.

"There is nothing in the Civil Aeronautics Act which empowers the Board to enforce an interpretation without meeting the certificate requirements of the Act unless there is a direct showing that enforcement of the certificate provisions would be in public interest," CAB continued.

"The legislative intent of the restriction provisions of the Act indi-

cates that its primary purpose is to provide relief for the specific service of the so-called third class operators and for carriers engaged in seasonal or limited operations. There is nothing in the Act or its legislative history to justify the Board in bypassing or circumventing the certificate provisions of the Act by authorizing extensive new operations which, although involving some exceptional characteristics, are neither limited in scope to emergency nor limited in extent."

■ **Board tried.**—Obviously tried by common sense and the regulations, CAB said, the carrier burden on Standard, Viking and ATC which would result from denial of their bid for broadened exemptions would consist only of a requirement that they continue their operations to those authorized by their letters of certificate.

"Ability of a carrier to launch extensive new operations which it believes would produce additional revenue is clearly not a sufficient showing of public benefit within the meaning of the Civil Aeronautics Act. Any operations conducted by these carriers beyond those authorized by their letters of certificate would be in their own interest, not in the public interest."

In rejecting the broadened exemption, the nonscheduled carriers had admitted they could not operate profitably if they continued with CAB's present regulations. Standard has admitted making over 1000 transcontinental trips with EC-75 in the past two and one-half years. CAB implied that if large transport type aircraft were used profitably under the nonscheduled exemption, others should be required to meet competition or a proper re-

striction should be obtained before regular service is undertaken.

"Carriers may not operate illegally in the event of economic prohibition. It is clear that any other policy would produce uncertainty and confusion among every class. If this principle is not followed, then by the same token a small certified carrier having made an investment in a large number of aircraft, or an airplane suitable for long range operations, could conceivably allege in the matter of another certified carrier on the ground of economic necessity."

■ **Court Victory.**—Meanwhile, Standard Air Lines won an important victory in the U. S. District Court for the Southern District of New York, where American Airlines had been seeking an injunction to restrain Standard from violations of the nonscheduled exemption. The court said it was without jurisdiction to grant American's relief.

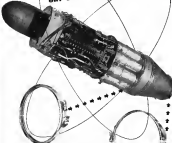
"It was not intended by the Civil Aeronautics Act that the courts should undertake to determine whether or not one who holds a valid letter of operation in an irregular carrier has forfeited the right to operate as such," the presiding judge declared. "I can conceive of serious chaos and conflict with CAB if the courts were to do so."

■ **Other rulings.**—Previously, courts in Hawaii and Alaska had accepted jurisdiction in similar cases and had granted injunctions against nonscheduled operators at the request of certificated carriers. CAB believes that if the New York decision is upheld it would be access to the courts by certificated carriers seeking regulation relief against nonscheduled competitive service by a regular operator. Further, it may prevent court action by CAB prior to an administrative determination by the Board that the particular operation is in fact, excessive.

Certificated carriers and CAB have fought operations against alleged violations of the nonscheduled exemption because court action is usually far faster than Board enforcement proceedings. The Standard decision permits action brought by CAB against Modern Air Transport in New York District Court and by American Airlines against Viking Airlines in New Jersey District Court. ■ **TACA.**—Meanwhile, order of Aug. 4 suspending Standard's letter of operation is still pending in the U. S. Circuit Court for the District of Columbia. Last week, the Board held a hearing on 41 new enforcement actions against Standard.

Meetings between Independent Air Carriers Association representatives and CAA and CAB officials to seek constructive answers to economic and safety issues affecting large passenger aircraft operators were held last week.

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Air Parcel Post

September debut of service boosts month's airmail volume 7 percent.

Introduction of air parcel post service boosted September's overall airmail business by 7 percent—or approximately 316,500 lb—according to latest estimates from Post Office Department officials.

Total airmail volume for the month was up 3 percent, totaling a two-year high of 8,254,181 lb, compared with

August's volume of 7,960,556 lb. A small portion of the increase, Deputy Special Assistant Postmaster General Robert Burgess declared, was due to a rise in first-class airmail. Its volume has risen in the upcoming year this past year (September, 1945) volume was 5,272,614 lb—or 2,011,607 lb below last month's level. But approximately 70 percent of the September increase has gone credited to new air parcel post business.

► **Disappointed Expected**—Post Office officials were somewhat disappointed with the first-month showing of the new service. It could be that airborne parcel post volume, not fully adapted to the country,

may be losing airspeed parcel post business continued to displace. The Air Transportation Association reported no noticeable lifting of all of its express traffic.

The \$16,100 lb September air parcel post volume is only a fraction of the airmail total—50,000,000 lb is a seventh, or 10 percent of the 500,000,000-lb-a-month surface parcel post volume.

► **Still Hoped-for**—Both Post Office and ATA officials and the Department's showing was an indication of the air parcel post outlook. Business circles and the public generally were not aware of the new service and its advantages. Promotion had been slow in getting underway. The advertising campaign to promote parcel post is just now getting into full swing.

Post Office officials remain optimistic on the future. They expect volume to last winter express business, as well as its express business, in the months to come.

Runways Unharmful By Jet Exhausts

Airport builders may have one less problem than they think. In the last few years, increasingly heavy civil aircraft have opened runways to be lengthened and strengthened. A few aviation experts, confronted with discussion and pressure on the subject of propeller-civil aircraft, airport builders and engineers were warning a new problem: Would the heat from jet exhausts be harmful to conventional forms of airport runway surface?

Now the airport division of the American Road Builders' Association, after studying the degree of gases or such heat and the intensity of temperatures at different levels above runway surfaces, has come up with an encouraging answer.

ARBA shows that while temperature of jet fuel emitted from central-type jet is as hot as 712 deg. F. at the outlet of tailpipes, it decreases rapidly to 132 deg. F. two feet above and below where the heat energy from tailpipe issues. However, the temperature climbs again to 167 deg. F. at a distance three feet above and below tailpipe nozzles at a point 25 ft. in back of them.

► **Remains That-Sort** ARBA, "lowers" as the temperature which is generated on the surface. Even the sun is frequently as high as 140 deg. F., it can be seen that the temperature of jet fuel... it is such low temperature to be harmless.

But, it adds, the effect of jet fuel spilled on certain portions of airfield pavements is harmful.

The Air Force already knows this. Experts here the Corps of Engineers have made provisions to protect surfaces of currently operating airports from the damaging effect of jet fuel.

Whether airports now under construction should make provision for this problem has been a question by William, Raymond-Graham Co. and Associates, engineers handling the pavements at Baltimore's Friendship International Airport, currently undergoing construction.

In a report to Baltimore City's Department of Aviation, it said:

"A spillage of fuel when in forcing operation on all types of aircraft having some detrimental effect on both asphalt and Portland cement types of pavement. In addition, jet aircraft emit some heat when operation is delayed during taxiing. The hazard had and in jet operations seems to reflect the pavement more rapidly than the high altitude gases used... today because it evaporates more slowly. The solvent... causes a dragging action as the aggregates of asphaltic concrete and a wearing and oiling of joint material in Portland cement concrete."

► **No Paving Damage**—Conclude the experts "It is now evident that the conventional runways would be prepared and aircraft for a number of years... it was felt that protective surfacing could be applied at such times as may become necessary either in the form of additional thickness to increase the load-carrying ability as part of an ordinary maintenance surfacing."

Brightest spot in the picture is the categorical statement from designers and manufacturers of jet engines that there are no grounds for expecting that severe technical errors or oversights in the design of Turbo IV airplanes.

Tudor IV Crash Unsolved

Disappearance of a British South American Airways Tudor IV transport between the Azores and Bermuda left twenty-five lives remain an unsolved mystery, according to the report of a Court of Investigation appointed by the British Ministry of Civil Aviation. No debris signals were received from the plane, which carried 15 persons, including Air Marshal Sir Arthur Gough-Lough.

Court of investigation and there are no grounds for expecting that severe technical errors or oversights in the design of Turbo IV airplanes.

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ALASKAN AIRLIFT

Helping to keep Alaska better stocked during the West Coast wartime strike, Pan American Airways recently flew the DC-4 into Fairbanks with over four of fresh food. The grocery spread consisted of meat, and produce. FAA said demands of Alaska and Hawaii for food, medicine and other vital supplies were being met despite the setback which has hit up Pacific Coast ports since the first week of September. Last month, Pan American flew 550,000 lb of cargo into Alaska and added 20 extra sorties to its normal schedule. Flights to Alaska were increased. The September Air Commerce Conference, commencing of unscheduled operations with a total of 25 planes in Alaska service, was flying into 30,000 to 40,000 lb of freight combined each day by the first of last month and several cargo shipments had increased. There had been the strike before Alaska Airlines, which has four DC-4s and five C-54s, was handling 40,000 lb daily to the Territory by early October.

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Trans-Australia Loss

(McGraw-Hill World News)

MELBURN.—The Commonwealth-owned Trans-Australia Airlines had a loss of \$967,000 in the year ended June 30 last. This was less than half TAA's deficit in 1945-47, an first year of operation. Mileage flown increased by 270 percent and revenue nearly tripled to about \$10,000,000.

Private airline operations have so far managed to keep on the black side of the ledger. Ansett Transport Industries Ltd., by diversifying its income sources, has chalked up a new record profit of \$110,000. Ansett operates the second largest private airline in addition to business tourist traffic and chartering flights.

SHORTLINES

► **Archuleta**—Regrets a \$700,000 profit during 1947. Company's first net consists of eight Bunko Villages and 15 D.C.s.

► **Angels**—An Export—Rancho expanded its service between Long Beach, Calif., and Cebu, Manila.

► **Capital**—Company's major direct and advertising has been selected as the best in the industry by the Direct Mail Advertising Association. Capital keeps its own records and other methods for its routing, making post cards to postcard delivery service and before the gathering and suggesting they (and by air. Messages on the cards are kept in each circulation. In the two months ended June 30 the carrier had a 14.7 percent return on its mailings on the basis of plate impressions. It obtained \$1221 worth of business from 517 cards of post cards.

► **New England Air Express**—is again using another plane to replace the DC-3 which recently made a forced landing on the beach at Great Harbor Key near Nassau, Bahamas, while on route from Toronto, N. J., to Miami and San Juan, Puerto Rico, with 19 passengers.

► **Northwest**—President Coolidge states that certification of Pan American Airways for a Pacific Northwest Alaska route will have no effect on NWA's plans for inaugurating service on the link by early winter. NWA was authorized to fly the route last July by direct order of President Truman. PAA also was certificated on the route last month.

► **Pan American**—Has inaugurated a new Los Angeles service between Miami and San Juan, P. R. — Passengers traffic on

PAA's Pacific-Alaska division gained 35 percent in the first six months of 1948 over the same period last year.

► **Panama International**—Reports flying 34,808,100 revenue passenger miles and 1,445,000 tons miles of mail and cargo during its first year of scheduled operations between New York and South America. Company said it completed 97.3 percent of all scheduled flights, of which 95.4 percent were on time or within 15 minutes of schedule.

► **Piedmont**—President T. B. Dore states that profits during July, August and September enabled the airline to show that its profits during the first five months after regular service was inaugurated last February.

► **Rohinson**—Will open service between Miami and Albany, N. Y., next month. W. F. R. Winters has been named sales manager.

► **Transamerica**—Douglas F. Johnson has become vice president in charge of sales.

► **Western**—Air freight volume increased 49 percent in the first eight months of this year over the same 1947 period.

► **Wisconsin Central**—Has been offered a higher mail rate by CAB for past and future periods. — Company is installing VHF communication equipment throughout its system. — Service to Guam Bay View, was inaugurated this month.

CAB SCHEDULE

Nov. 16—Starting in 11 at 10:00 a.m. service. (Docket 1001) at all 11.

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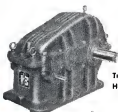
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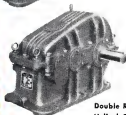
This new line of Foote Bros. Maxi-Power parallel shaft enclosed helical gear drives offers American industry the maximum in high quality and rugged dependability.

The experience gained by Foote Bros. engineers in producing gears of almost laboratory precision is reflected in the high quality helical gears in this line of drives. The manufacturing experience of Foote Bros. dates back nearly a century, assuring industry the last word in power transmission equipment.

Foote Bros. Maxi-Power parallel shaft drives are available in single, double and triple reduction types in a wide range of sizes and ratios to meet practically any service need. An advance information sheet giving dimensions and ratios is available. Mail the coupon below for your copy.



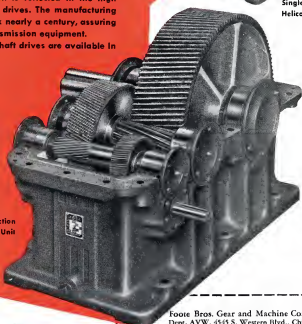
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Helical Gear Unit



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